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# APPRENTICESHIP TRAINING

## GLASSWORKER Program

The logo for the Government of Alberta, featuring the word "Alberta" in a stylized, bold, sans-serif font. The letter "A" is unique, with a vertical bar on its left side that extends above and below the main body of the letter.

CAREER DEVELOPMENT AND EMPLOYMENT  
Apprenticeship and Trade Certification



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## COURSE OUTLINE

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# GLASSWORKER TRADE

## THE GOAL OF APPRENTICESHIP TRAINING

To develop a competent tradesman who, through skill and knowledge, is capable of producing with accuracy and precision the scope of work and services covered by the industry.

THE PRODUCT OF APPRENTICESHIP — a graduate who will:

- ★ Be skillful in cutting, preparing, fabricating or other handling of all glass materials for buildings, fixtures and other uses.
- ★ Do the glazing, setting, attachment, installation, removal of all types of glass material for buildings, fixtures and other uses.
- ★ Be capable of doing the installation, fitting fabrication and attachment of architectural metals or related products for all types of buildings.
- ★ Use efficiently and safely all hand and power operated equipment used by the Tradesman.
- ★ Be able to produce from blueprints and working drawings the type of products made and used by the industry.
- ★ Relate to the work of other tradesmen in affiliated trades.
- ★ Carry out damaged lite removal procedures, installations and sealing of new parts. Understand use of specialized tools, lubricants and sealants.
- ★ Understand and be able to use the National Auto Glass Specifications Parts Book including identification and selection of bent glass parts — heat treated or laminated — cutting and edgework procedures for laminated flat glass to N.A.G. specifications.

## **GLASSWORKER APPRENTICESHIP INFORMATION**

### **Basic Requirements:**

- ★ Indenture for four periods of Trade experience.
- ★ Attend a six week technical training course in the first, second, third and fourth periods.
- ★ Fulfill the requirements for each period including 1800 hours of work experience inclusive of time spent at the training course; successfully complete the technical training course and obtain a satisfactory employer's report.
- ★ Education — the minimum requirement is completion of grade nine or a pass mark on an entrance examination as prescribed by the trade regulation.
- ★ Age — the minimum age for apprentices is 16 years. There is no upper age limit.

### **Credits:**

- ★ Accelerated patterns of apprenticeship may be granted for related technical training and/or experience.

### **Benefits:**

- ★ Apprenticeship is a learning-while-earning program. While working at the trade during apprenticeship, apprentices are assured by regulation of a minimum percentage of the journeyman rates: 65% during the first period, 70% during the second period, 75% during the third period, 85% during the fourth period. Progress from one rate to the next takes place only after successful completion of all the requirements for each period.

- ★ All apprentices 17 years of age and older are normally eligible for training allowances while attending technical training courses. These allowances are funded by the Canada Employment and Immigration Commission.

Administrative procedures establishing the amount of training allowance is complex and can vary with an individual's circumstances. Contact a local Canada Employment Centre for details.

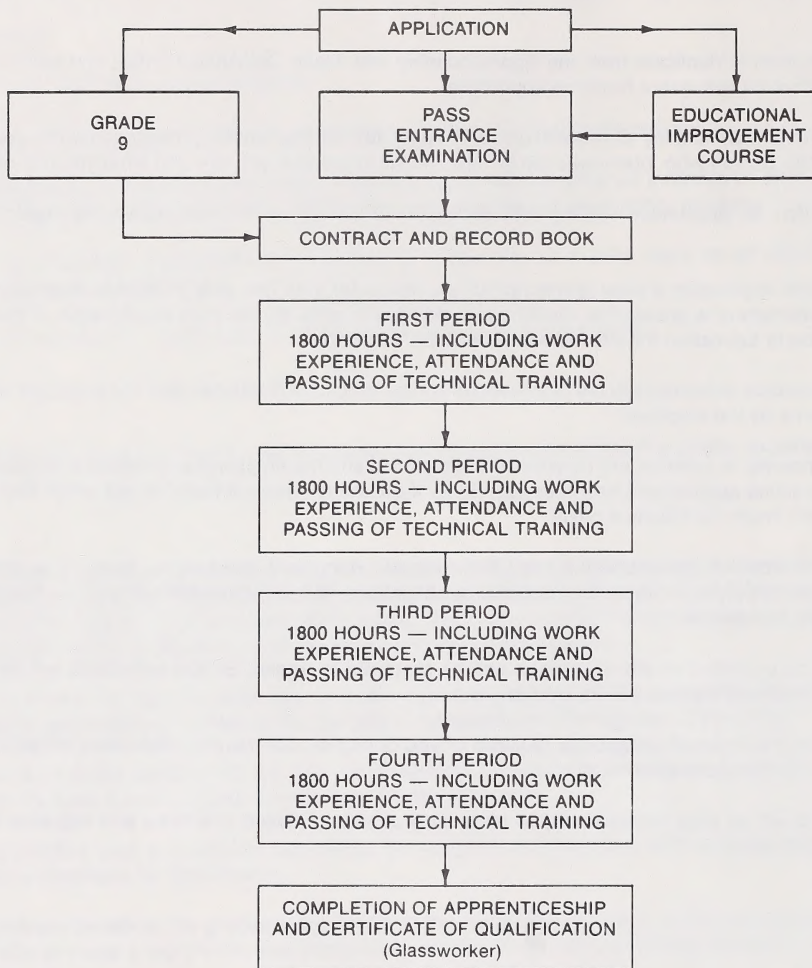
- ★ An Alberta apprentice who successfully completes the program will graduate with a Completion of Apprenticeship Certificate and a Certificate of Qualification.
- ★ The most significant benefit to the graduate apprentice is that he is well trained in technical and practical aspects of the trade and is able to make a worthwhile and productive contribution to society. Society in return, will provide an opportunity for livelihood.



## DIRECTIONS FOR PROSPECTIVE APPRENTICES

- ★ Contact your nearest Apprenticeship and Trade Certification office for detailed information and counselling (see list of offices on page 20).
- ★ Obtain an application form in duplicate from the Apprenticeship and Trade Certification office and neatly complete, on both copies, the information requested from the apprentice.
- ★ Contact in person, firms that employ Glassworkers and apply for an apprentice position. Present your apprentice application forms to the person who interviews you so that he will know who you are and what you can offer his firm.
- ★ Persevere in the search for apprentice employment and upon obtaining employment, leave the application with the employer.
- ★ Attach to the apprentice application a copy (transcript) of the marks for your last year of school. Applicants who do not have their school transcripts or a grade nine standing are required to write an entrance examination. If transcripts have been lost, contact Alberta Education for information on school transcripts.
- ★ Any time credit, for previous experience in the Glassworker trade, should be discussed with the employer and requested on the application forms by the employer.
- ★ A contract of apprenticeship is entered into between the apprentice and the employer and should be signed within three months after the apprentice applications has been approved. If contracts have not been issued within this time, contact the Apprenticeship and Trade Certification office.
- ★ Before signing the contract of apprenticeship read the complete document carefully — know your obligations and responsibilities to your employer — know the employer's obligations and responsibilities to you — feel confident you have selected the right occupation.
- ★ Know when you will be expected to attend classes and be prepared to attend. School schedules will be sent to your employer and notice to attend classes will be sent to you.
- ★ Prepare in advance for the financial obligations required of you during school training. Reference materials and school supplies are paid for by the apprentice.
- ★ While an apprentice, it will be your responsibility to respond promptly to mailed directions and requests from Apprenticeship and Trade Certification.

## APPRENTICESHIP ROUTE TOWARD CERTIFICATION





## APPRENTICESHIP COMMITTEE STRUCTURE

### Glassworker Provincial Apprenticeship Committee

The Provincial Apprenticeship Committee for the Glassworker Trade is comprised of members from Local Apprenticeship Committees from the cities of Edmonton and Calgary.

This Committee is concerned with the policies that guide the program and make recommendations to the Apprenticeship and Trade Certification Board and the Executive Director of Apprenticeship and Trade Certification in the following areas:

- ★ Contribute current information relative to changes in the trade and requirements of industry.
- ★ Make recommendations for changes to existing trade regulations.
- ★ Assist in updating of the training program through recommendations for revisions to the course outline and attendant examinations.

### Glassworker Local Apprenticeship Committee

Local Apprenticeship Committees are concerned with individuals and trade situations within a local region. Meetings are held throughout the year to make recommendations and to discuss problems relating to the apprenticeship program. Members who serve on committees are nominated by employer and employee representation in accordance with The Manpower Development Act.

### Apprenticeship Committee Members:

Mr. T. G. Woodman — Edmonton LAC — Employer  
Mr. R. Arnold — Edmonton LAC — Employer  
Mr. C. Rae — Edmonton LAC — Employer  
Mr. S. Romanko — Edmonton LAC — Employee  
Mr. G. Zingle — Edmonton LAC — Employee  
Mr. D. Ward — Calgary LAC — Employer  
Mr. A. Deviat — Calgary LAC — Employee  
Mr. S. Ledbury — Calgary LAC — Employee  
Mr. C. George — Calgary LAC — Employer (Alternate)  
Mr. A. Wright — Calgary LAC — Employee (Alternate)

## **GLASSWORKER PROGRAM COURSE OUTLINE**

This outline has been prepared in accordance with recommendations from the Provincial Apprenticeship Committee for the Glassworker Trade in the Province of Alberta.

The outline was updated following consideration given to recommendations and suggestions from:

Local Apprenticeship Committees  
Representatives from the training institute  
Curriculum Sub-Committee from the Provincial Apprenticeship Committee

### **PROCEDURES FOR RECOMMENDING REVISION(S) TO THE COURSE OUTLINE**

Any concerned citizen or group in the Province of Alberta may make recommendations for change by writing to Apprenticeship and Trade Certification, Edmonton.

It is requested that recommendations for change refer to specific areas and state references used. Recommendations received will be placed before regular meetings of the Provincial Apprenticeship Committee.

### **SAFETY EDUCATION**

Safe working procedures and conditions, accident prevention and the preservation of health is of primary importance in the Apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of the government, employers, employees and the general public. Therefore, it is imperative that all parties become aware of circumstances that may lead to injury or harm and that safe learning experiences and environment can be created by controlling the variables and behaviors that may contribute to or cause an accident and/or an injury.

It is generally recognized that a safe attitude contributes to an accident free environment. As a result a healthy safe attitude towards accidents will benefit an employee by helping to avoid injury, loss of time and loss of pay.

A tradesman is possibly exposed to more hazards than any other person in the work force and therefore, should be familiar with the Occupational Health and Safety Act and Regulations dealing with his own personal safety and the special safety rules applying to each job.

### **LEGAL AND ADMINISTRATIVE ASPECTS**

#### **Employer's Responsibilities:**

Accident prevention and the provisions of safe working conditions are the responsibilities of an employer. The company is responsible for:

1. The provision and maintenance of safety equipment
2. The provision of protective devices and clothing (as required by the Occupational Health & Safety Act, General Safety Regulations)
3. The enforcement of safe working procedures
4. Adequate safeguards for machinery, equipment and tools
5. Observance of all accident prevention regulations
6. Adequate training to allow a worker to use or operate equipment in an effective and safe manner.

**Government's Responsibilities:**

Apprenticeship and Trade Certification in conjunction with the respective Provincial Apprenticeship Committee assumes the responsibility to assure that adequate safety is reflected in the curriculum and that adequate safety instruction is presented at the training establishments.

The Occupational Health and Safety Inspection Branch assumes the responsibility for periodic inspection of the operation to ensure that regulations for industry are being correctly observed.

**Individual's Responsibilities:**

The employee is responsible for:

1. Knowing and working in accordance with the safety regulations pertaining to job environment and
2. Working in such a way as not to endanger himself or his fellow employees

The major factor in safety is the individual employee, his personal attitude toward safety and having an awareness of the respective safety regulation.



## GLASSWORKER PROGRAM

### Subjects and Time Distribution

<b>First Period</b>	<b>6 Weeks</b>	<b>30 Hours Per Week</b>	<b>180 Hours</b>
Section One:	Theory .....		36 Hours
Section Two:	Trade Mathematics .....		18 Hours
Section Three:	Blue Print Reading .....		36 Hours
Section Four:	Practical (Shop) .....		90 Hours
<b>Second Period</b>	<b>6 Weeks</b>	<b>30 Hours Per Week</b>	<b>180 Hours</b>
Section One:	Theory .....		36 Hours
Section Two:	Trade Mathematics .....		18 Hours
Section Three:	Blue Print Reading .....		36 Hours
Section Four:	Practical (Shop) .....		90 Hours
<b>Third Period</b>	<b>6 Weeks</b>	<b>30 Hours Per Week</b>	<b>180 Hours</b>
Section One:	Theory .....		36 Hours
Section Two:	Trade Mathematics .....		18 Hours
Section Three:	Blue Print Reading .....		36 Hours
Section Four:	Practical (Shop) .....		90 Hours
<b>Fourth Period</b>	<b>6 Weeks</b>	<b>30 Hours Per Week</b>	<b>180 Hours</b>
Section One:	Theory .....		36 Hours
Section Two:	Trade Mathematics .....		18 Hours
Section Three:	Blue Print Reading .....		36 Hours
Section Four:	Practical (Shop) .....		90 Hours

Occupational Health and Safety Regulations should be practiced and taught throughout the program.

**FIRST PERIOD TECHNICAL TRAINING  
GLASSWORKER TRADE  
COURSE OUTLINE**

<b>SECTION ONE:</b>	<b>THEORY</b>	<b>36 Hours</b>
<b>TOPIC</b>	<b>COURSE OBJECTIVES</b>	
	Upon successful completion of this unit, the apprentice should be able to:	
<b>A. Glass</b>		<b>16 Hours</b>
	<ol style="list-style-type: none"> <li>1. Quote a general history of glass and the glazing trade.</li> <li>2. Describe methods and materials used to manufacture glass.</li> <li>3. List the standard dimensions of glass.</li> <li>4. Describe the manufacture of safety laminated glass, tempered glass and mirrors.</li> <li>5. List the types and composition of glass and their use.</li> <li>6. List the types of business involved in the glass industry and their function.</li> <li>7. Describe the relationship of the Alberta Apprenticeship System to the Glassworker trade.</li> </ol>	
1. Storage and Handling of Glass and Metal	<ol style="list-style-type: none"> <li>1. Describe the structural requirements of racks.</li> <li>2. List the basic principles of hoisting, moving, supporting and bracing of heavy and unwieldy objects.</li> </ol>	
2. Occupational Health and Safety Regulations	<ol style="list-style-type: none"> <li>1. List the requirements of the regulations that apply to handling glass.</li> </ol>	
3. Explosive Actuated Tools	<ol style="list-style-type: none"> <li>1. Describe the safe and effective operation of high and low velocity tools.</li> <li>2. Identify types of charges by code and the types and uses of fastener.</li> </ol>	
<b>B. Glass Cutting and Shaping</b>		<b>4 Hours</b>
	<ol style="list-style-type: none"> <li>1. List and describe the tools used to cut and shape glass.</li> <li>2. Identify the correct material for a given job. Considering design criterion and applicable codes.</li> </ol>	
1. Edge treatments	<ol style="list-style-type: none"> <li>1. Describe the safe operation and maintenance of the tools and equipment used to treat the edge of glass.</li> <li>2. Describe the properties and uses of abrasives, coolants and lubricants used to treat the edges of glass.</li> </ol>	
<b>C. Glazing and Repair</b>		<b>10 Hours</b>
	<ol style="list-style-type: none"> <li>1. List and describe the tools and equipment used to glaze wood, aluminum and steel sash.</li> <li>2. Describe the properties of window screen.</li> <li>3. Describe the make up and correct use of putties used for wood and metal sash.</li> <li>4. Describe the purpose and make up of wood and metal sealants.</li> <li>5. Interpret building codes, C.S.A. standards and Hazardous Products Act as they apply to the trade.</li> <li>6. List minimum and maximum clearances for glass when glazing.</li> <li>7. List minimum and maximum bites for glazing sash.</li> </ol>	
1. Occupational Health and Safety	<ol style="list-style-type: none"> <li>1. List the principles of safe scaffolding and ladders.</li> </ol>	
2. Customer relations	<ol style="list-style-type: none"> <li>1. Describe the proper rapport between the glassworker and his employer and the customer.</li> </ol>	

2. Describe the desirable relationship between the Glassworker and other trades and inspectors.

**D. Sash and Frames**

**2 Hours**

1. Describe the standard material used for window sash.
2. Describe the tools used to fabricate sash.
3. List commonly used caulking compounds and their uses.
4. List the common types of manufactured windows.
5. Describe the typical surrounds in wood frame and masonry structures.
6. List the tools used to install frames and their care.

**E. Auto Glass**

**4 Hours**

1. List the tools used to remove and install auto glass.
2. Describe the makeup of auto glass for windshields backlight and sidelight.
3. Interpret the National Auto Glass Catalogue.
4. Describe the gaskets and sealants used for windshields and backglass.
5. Describe the installation methods used for gasketless auto glass.
1. Describe the proper rapport between the customer, glassworker and employer.

**1. Customer relations**

**SECTION TWO:**

**MATHEMATICS**

**18 Hours**

TOPIC

COURSE OBJECTIVES

Upon successful completion of this unit, the apprentice should be able to:

**A. Trade Mathematics**

**18 Hours**

1. Calculate mass by volume.
2. Calculate linear measurements.
3. Calculate areas of geometric figures.
4. Calculate clearances and bites.
5. Calculate perimeters of geometric figures.
6. Calculate mark ups and discounts as they apply to pricing.

**SECTION THREE:**

**BLEUPRINT READING**

**36 Hours**

TOPIC

COURSE OBJECTIVES

Upon successful completion of this unit, the apprentice should be able to:

**A. Drawing Interpretation**

**36 Hours**

1. Draw orthographic drawings to scale of sash, window frames and doors as they relate to buildings using an accepted alphabet of lines and symbols.
2. Draw cross sections and details for shop work using accepted abbreviations lettering and dimensions.
3. Make cutting lists of glass from blueprints.
4. Locate dimensions of windows, etc. from blueprints.
5. Read metric and imperial scales.



## TOPIC

## COURSE OBJECTIVES

Upon successful completion of this unit, the apprentice should be able to:

**A. Glass****12 Hours**

1. Storage and handling of glass and metal
2. Safety

1. Crate and uncrate glass in a safe and efficient manner.
2. Store and remove from storage glass and metal in the shop and on the job.
1. Comply with safety regulation.
2. Keep shop area clean and tidy.
3. Fire explosive actuated tools in a safe and effective manner.
4. Work safety from ladder and scaffolding.

**B. Glass Cutting and Shaping****45 Hours**

1. Edge treatments
2. Glazing and repair
3. Customer relations

1. Cut float, flat safety and pattern glass to straight lines, circles and patterns including incuts.
1. Treat the edges of float, thick float, laminated, mirror and wire glass with a/an ground, arrised polisher and seamed edge.
2. Cut and finish glass sliding doors.
1. Glaze wood, aluminum and steel sash.
2. Fabricate screens.
3. Apply sealants to wood and metal.
1. Conduct himself in a manner that will promote the industry.

**C. Sash and Frames****15 Hours**

1. Fabricate windows from commercial metal.
2. Install sash in wood frames.
3. Caulk perimeters of windows.
4. Install window frames.

**D. Auto Glass****18 Hours**

1. Customer relations

1. Install windshields and back glass with minimum journeyman supervision.
2. Hook up "in glass" radio antennas and defoggers.
3. Pattern cut side and vent glass from laminated safety glass.
4. Ship and store autoglass.
5. Keep all work areas clean and tidy.
1. Respect the customer's property.
2. Work in clean and efficient manner.

**SECOND PERIOD TECHNICAL TRAINING  
GLASSWORKER TRADE  
COURSE OUTLINE**

<b>SECTION ONE:</b>	<b>THEORY</b>	<b>36 Hours</b>
<b>TOPIC</b>	<b>COURSE OBJECTIVES</b>	
	Upon successful completion of this unit, the apprentice should be able to:	
<b>Review</b>	1. Display the knowledge taught in first period.	<b>3 Hours</b>
<b>A. Glass</b>		<b>8 Hours</b>
1. Drilling and shaping	1. Describe the properties and uses of abrasives, coolants and lubricants used to drill glass. 2. Describe the effects of speed and heat when drilling glass.	
2. Mirrors and decorative glass	1. Describe the quality of glass used for mirrors. 2. Describe the material and methods of application used to silver mirrors. 3. Describe the methods used to color and stain glass. 4. Describe the methods used to scratch polish. 5. Describe the finish obtained by sand blasting glass. 6. List methods used to engrave glass.	
3. Glass types	1. Describe the advantages, limitations and methods used to cut and shape: (a) tempered glass (b) heat strengthened glass (c) insulating glass (d) laminated glass (e) heat absorbing glass (f) glare reducing glass (g) structural glass (h) reflective glass (i) wired glass	
<b>B. Glazing</b>		<b>7 Hours</b>
1. Wood and metal sash	1. Describe the theory of energy efficient windows. 2. Describe the methods used and the necessary precautions to be taken when replacing store front glass. 3. Describe the fastening devices used for glass. 4. Describe the safe use of scaffolding, manlifts and forklifts.	
<b>C. Glazing compounds and sealants</b>		<b>5 Hours</b>
	1. Identify and list the limitations of glazing compounds and sealants such as: (a) compression materials (b) neoprene (c) vinyl (d) rubber (e) glass cements (f) silicone (g) polybutane tapes (h) polysulphide	

TOPIC	COURSE OBJECTIVES	
<b>D. Metal Work</b>		<b>3 Hours</b>
	1. Name the components of window frames.	
<b>E. Auto Glass</b>		<b>10 Hours</b>
1. Windshield	1. Describe the major causes of comebacks for faulty workmanship.	
2. Sideglass	1. Describe the faults generally found to cause problems in side glass.	
	2. Describe the removal and replacement of outside mouldings and clips.	
	3. Describe removal and replacement of doorlites and opera windows.	
3. Custom windows	1. Describe the installation of custom glass in vans and panel trucks including tear drops, fixed lites and sliding windows.	
	2. Produce patterns and gaskets for custom windows.	
4. Catalogues	1. Cross reference NAGS catalogue.	
	2. Interpret Auto Service manuals as they apply to glass.	

<b>SECTION TWO:</b>	<b>MATHEMATICS</b>	<b>18 Hours</b>
TOPIC	COURSE OBJECTIVES	

Upon successful completion of this unit, the apprentice should be able to:

**Review**

1. Display the knowledge taught in first period.

**A. Calculations**

1. Calculate perimeters and areas of geometric figures.
2. Calculate center to center measurements.
3. Calculate material requirements including waste and pricing.
4. Calculate united inches.
5. Calculate conversions from imperial to metric measure when required.

<b>SECTION THREE:</b>	<b>BULEPRINT READING</b>	<b>36 Hours</b>
TOPIC	COURSE OBJECTIVES	

Upon successful completion of this unit, the apprentice should be able to:

**Review**

1. Display the skills and knowledge taught in first period.

**A. Blueprints and Shop Drawings**

1. Take off sizes of lites from shop drawings and blueprints.
2. Locate holes and in cuts from drawings and specifications.
3. Make shop drawings and free hand sketches for shop use.
4. Read window and door schedules.
5. Identify hand of door and opening of windows from blueprints.



Upon successful completion of this unit, the apprentice should be able to:

<b>Review</b>	1. Display the skills taught in first period.	<b>6 Hours</b>
<b>A. Glass</b>		<b>18 Hours</b>
1. Cutting	1. Pattern cut glass. 2. Cut 6 mm — 10 mm and 12 mm float glass. 3. Set up, cut and finish shelves and edges. 4. Production cut glass. 5. Cut glass accurately free hand.	
2. Drilling and shaping	1. Drill holes in glass using manual and automatic drills. 2. Maintain drilling equipment.	
3. Mirrors and decorative glass	1. Cut, from stock sizes, bevel, drill and polish mirrors. 2. Sand blast glass. 3. Clean and strip mirrors. 4. Remove scratches using scratch polishing machine. 5. Engrave glass. 6. Lay out, field assemble and attach mirrors.	
<b>B. Glazing</b>		<b>6 Hours</b>
	1. Wood and metal sash 2. Prepare and glaze new wood sash. 3. Store and ship glazed units. 4. Prepare and glaze wood sash with insulation glass. 5. Install insulated units to achieve the maximum insulating value. 6. Glaze metal sash.	
2. Store front glass	1. Remove and replace store front glass.	
<b>C. Glazing Compounds and Sealants</b>		<b>3 Hours</b>
	1. Apply glazing compounds to wood and metal sash. 2. Caulk windows and surrounds in a workman like manner.	
<b>D. Metal Work</b>		<b>36 Hours</b>
	1. Fabricate and install shower doors and tub enclosures using hand tools. 2. Install patio doors using hand tools. 3. Cut shape and install show case doors using hand tools. 4. Frame glaze and install entrance doors including closers and locks. 5. Trouble shot and repair doors and hardware.	
<b>E. Auto Glass</b>		<b>21 Hours</b>
1. Windshields	1. Remove and install windshields in sports cars foreign cars, trucks, tractors, etc.	

## TOPIC

### 2. Side glass

## COURSE OBJECTIVES

1. Remove and install moveable and stationary door glass and service manual and power openers.
2. Install and adjust quarter glass and opera windows.
3. Install custom van windows and sunroofs.
4. Pattern cut windows.

# THIRD PERIOD TECHNICAL TRAINING GLASSWORKER TRADE COURSE OUTLINE

SECTION ONE:	THEORY	36 Hours
TOPIC	COURSE OBJECTIVES	
Upon successful completion of this unit, the apprentice should be able to:		
<b>Review</b>		<b>6 Hours</b>
<b>A. Metal Work</b>		<b>12 Hours</b>
1. Aluminum	1. Display the knowledge taught in first and second periods.  1. Describe a general history of aluminum. 2. Describe the basic refining process. 3. Describe the general process of extruding. 4. Describe the methods and materials used to finish aluminum: (a) anodize (b) hard coat (c) enamel 5. Describe the function of extrusions used for store fronts including: (a) finned (b) flush lines (c) core (d) split (e) thermal broken	
<b>B. Frames</b>		<b>15 Hours</b>
	1. Describe a reasonable job schedule providing for material delivery and installation for store fronts. 2. Describe entrance door systems including: (a) sliding (b) revolving (c) balanced (d) tempered 3. Describe door hardware involving: (a) closures (b) hinges (c) pivots, etc. 4. Describe the methods used to anchor and reinforce sash and division bars. 5. Describe the use and installation of brake shapes.	
<b>C. Glass and Glazing</b>		<b>3 Hours</b>
	1. Describe suspended glazing, its purpose and installation methods. 2. Describe the types of doors and hardware used in show cases.	
SECTION TWO:	MATHEMATICS	18 Hours
TOPIC	COURSE OBJECTIVES	
Upon successful completion of this unit, the apprentice should be able to:		
<b>Review</b>		
	1. Display the knowledge taught in first and second period.	



**A. Calculations**

1. Calculate material requirements, including waste and pricing.
2. Calculate bearing stress and deflection of extrusions.
3. Calculate glass from opening size.
4. Calculate the coefficient of expansion and contraction of material.
5. Calculate cutting lists of metal from drawings.

**SECTION THREE:**

**BLUEPRINT READING**

**36 Hours**

TOPIC

COURSE OBJECTIVES

Upon successful completion of this unit, the apprentice should be able to:

**Review**

1. Display the skills and knowledge taught in first and second period.

**A. Blueprint Reading and Drawing**

1. Draw sectional views of extrusions.
2. Make shop drawings, cutting lists and sketches for shop projects.
3. Take off materials that apply to the trade from blueprints.
4. Make drawing and sectional views of various shapes for formed metal trim.
5. Follow plans, specification and codes for the installation of suspended glazing.

**SECTION FOUR:**

**PRACTICAL**

**90 Hours**

TOPIC

COURSE OBJECTIVES

Upon successful completion of this unit, the apprentice should be able to:

**Review**

1. Display the skills taught in first and second period.

**A. Frames**

**66 Hours**

1. Make and use jigs for fabrication and installation.
2. Layout, cut and assemble store fronts.
3. Fabricate door frames including transoms and side lights.
4. Install, replace and repair door hardware.
5. Operate power tools in a safe and efficient manner including:
  - (a) cut of saws
  - (b) table saws
  - (c) drill press
  - (d) grinders, etc.
6. Install frames and caulk in a workman like manner.
7. Make metal trim using hand tools and brakes.

**B. Glass and Glazing**

**24 Hours**

1. Install suspended glazing.
2. Cut, edge, and install show case glass including hardware.
3. Butt joint glaze.
4. Install mirrors.

**FOURTH PERIOD TECHNICAL TRAINING  
GLASSWORKER TRADE  
COURSE OUTLINE**

<b>SECTION ONE:</b>	<b>THEORY</b>	<b>36 Hours</b>
TOPIC	COURSE OBJECTIVES	
	Upon successful completion of this unit, the apprentice should be able to:	
<b>Review</b>		<b>3 Hours</b>
	1. Display the knowledge taught in first, second and third period.	
<b>A. Frames and Doors</b>		<b>4 Hours</b>
	1. List the causes and remedies for malfunctioning automatic doors.	
<b>B. Curtain Walls</b>		<b>9 Hours</b>
	1. Describe the types of curtain walls, anchors, re-inforcing, structural requirements, expansion and sealing.	
<b>C. Glass and Glazing</b>		<b>10 Hours</b>
	1. Describe special windows such as venetian blinds, between glass and sullsash, etc.	
	2. Describe all glass store fronts and suspended glazing.	
<b>D. Skylights and Slope Glazing</b>		<b>10 Hours</b>
	1. Describe the special considerations that must be given to: drainage, sealing, flashing, condensation and glass.	
	2. Describe the properties and uses of aluminum alloys and tempered aluminum.	
<b>SECTION TWO:</b>	<b>MATHEMATICS</b>	<b>18 Hours</b>
TOPIC	COURSE OBJECTIVES	
	Upon successful completion of this unit, the apprentice should be able to:	
<b>Review</b>		
	1. Display the skills taught in first, second and third period.	
<b>A. Calculations</b>		
	1. Calculate angles and slopes.	
	2. Take off materials.	
	3. Calculate live and dead loads for sloped glazing.	
	4. Calculate material requirements and make cutting lists for curtain walls.	
	5. Calculate wind loads on curtain walls.	
	6. Calculate labor costs for fabrication transporting, installation and storage of glass and related materials.	

**SECTION THREE:****BLUEPRINT READING****36 Hours****TOPIC****COURSE OBJECTIVES**

Upon successful completion of this unit, the apprentice should be able to:

**Review**

1. Display the knowledge taught in first, second and third period.

**A. Shop Drawing**

1. Sloped glazing

1. Make shop drawings from blueprints and on-site measurements.

2. Follow specifications and codes.

2. Curtain walls

1. Make shop drawings from blueprints and on-site measurements.

2. Draw details and sections applicable to curtain walls.

3. Frames and doors

1. Draw working drawings from manufacturers specification.

**SECTION FOUR:****PRACTICAL****90 Hours****TOPIC****COURSE OBJECTIVES**

Upon successful completion of this unit, the apprentice should be able to:

**Review****3 Hours**

1. Display the skills taught in first, second and third period.

**A. Frames and Doors****48 Hours**

1. Fabricate and install double door frames with transom, sidelite, doors and closures.
2. Install centre pivot hinges, butt hinges, latch locks and maximum security locks.
3. Install automatic doors with electrical and hydraulic controls.
4. Trouble shoot and repair automatic doors.

**B. Curtain Walls****33 Hours**

1. Layout, fabricate and install curtain walls.
2. Demonstrate the considerations for venting, draining, expansion and sealing curtain walls.
3. Work safely from swing staging.

**C. Skylights and Slope Glazing****6 Hours**

1. Layout, fabricate and install glass and flashing effectively to perform the function of their design.
2. Caulk, seal and provide drainage in a satisfactory manner.
3. Trouble shoot and repair sloped glazing.
4. Shape and install acrylics and plastics used in place of glass.

## **SUGGESTED REFERENCE MATERIALS**

1. Building Trades Blueprint Reading — Part Two — Elmer W. Sunberg
2. NAGS Catalogue
3. Occupational Health and Safety Regulations

## **TECHNICAL TRAINING SCHOOLS**

The Glassworker apprenticeship training program is offered by Alberta Career Development and Employment, Apprenticeship and Trade Certification. Staff and facilities for teaching the program are supplied by:

1. Southern Alberta Institute of Technology

## **LOCATION OF APPRENTICESHIP AND TRADE CERTIFICATION REGIONAL OFFICES**

BONNYVILLE

CALGARY

EDMONTON

FORT McMURRAY

GRANDE PRAIRIE

HINTON

LETHBRIDGE

MEDICINE HAT

PEACE RIVER

RED DEER

VERMILION





N.L.C. - B.N.C.



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